taught in our public schools far more thoroughly than is done at present.

We wish to point out that the classical training in public schools is for the average boy a deplorable waste of most valuable time, and though a small minority doubtless derive advantages from the study of the classics, yet we deprecate most strongly the amount of time spent on them, and the prevalent specialisation in them on antiquated lines, with an adherence to conditions that no longer exist, while real essentials for our national success are dangerously neglected. As it is, the public-school boy, who is doing so splendidly, both as a man and a soldier, in the great ordeal through which we are passing, suffers a severe and unnecessary handicap, both in the military and commercial professions, compared with our present enemies and permanent trade competitors.

It is intended to form a deputation to approach the Conference of Headmasters, to ensure that our wishes may be carried out. Kindly state if you are in sympathy with this letter, and if you approve of such deputation. This letter has been sent to the *Times* and the parents of boys at one of the leading public schools, the headmaster of which is in favour of receiving the deputation.

Avebury.
Desborough.
Claud J. Hamilton.
Jn. Jellicoe, Admiral.
Arthur Leetham.
J. E. Thornycroft.
Charles Walpole.
Philip H. Waterlow.

NOTES.

The tragic news that Lord Kitchener, the Secretary of State for War, had been drowned off the Orkneys, in the sinking, either by a mine or torpedo, of the cruiser *Hampshire,* in which he was travelling with a party on a special mission to the Emperor of Russia, was received by the nation on Tuesday with deep emotion. Lord Kitchener was born on June 24, 1850, entered the Royal Military Academy at Woolwich in 1868, and obtained a commission in the Royal Engineers in 1871. In the early years of his professional career he did notable surveying work for the Palestine Exploration Fund. He was engaged from 1874 to 1878 in mapping 1600 square miles of Judah and Philistia, and in surveying part of western Palestine. Later, he did similar work for the construction of a map of Cyprus, and also took part in the survey of the Sinai Peninsula. In all the offices occupied by Lord Kitchener, and enterprises undertaken by him, he was strong with the strength of organised knowledge; and that was the secret of his success. While British Agent and Consul-General in Egypt, a post to which he was appointed in 1911, he had the Department of Agriculture transformed into a Ministry, and promoted many movements to improve the agricultural position of the country. He was also chiefly responsible for the establishment of the fine Gordon Memorial College at Khartum. His life was devoted to the service of the State, and in that service it has been lost at a time when the nation can ill afford to be deprived of genius for organised administration in every department. Two members of Lord Kitchener's party, who were lost with him, were Sir H. F. Donaldson and Mr. L. S. Robertson. Sir Frederick Donaldson was formerly Chief Superintendent of the Royal Ordnance Factories, and resigned that post in September last to become chief technical adviser to the Ministry of Munitions. He was president of the Institution of Mechanical Engineers in 1913. Mr. Leslie S. Robertson, assistant to the director of production in the Ministry of Munitions, was secretary of the Engineering Standards Committee.

The list of honours conferred in celebration of the King's birthday includes five new peerages, seven Privy Councillorships, twelve baronetcies, thirty-one knighthoods, and a number of other promotions and appointments. Among the names of men either distinguished by their scientific work or associated closely with it, we notice the following :—*Knights* : Dr. G. T. Beilby, F.R.S.; Dr. M. A. Ruffer, C.M.G., formerly professor of bacteriology at Cairo Medical School; Dr. J. J. H. Teall, F.R.S., late director of the Geological Survey of Great Britain; Mr. R. F. Stupart, director of the Meteorological Service of Canada; and Dr. N. Tirard, medical editor of the "British Pharmacopœia" (1914), and for twenty years' secretary of the Pharmaceutical Committee of the General Medical Council. *K.C.M.G.* : Dr. W. Baldwin Spencer, C.M.G., F.R.S., professor of biology in the University of Melbourne. *Privy Councillor* : Dr. Christopher Addison, Parliamentary Secretary to the Ministry of Munitions, and late professor of anatomy in the University of Sheffield. *K.C.B.* : Mr. R. H. Rew, C.B., assistant secretary, Board of Agriculture. *C.B.* : Col. C. F. Close, Director-General, Ordnance Survey; Col. A. P. Blenkinsop, Assistant Director-General, Army Medical Service; Major P. S. Lelean, assistant professor, Royal Army Medical College; Col. C. E. Nuthall, Deputy Director-General, Army Veterinary Service. *M.V.O.* : Dr. N. D. Bardswell, medical superintendent, King Edward VII.'s Sanatorium, Midhurst, Sussex; Dr. F. S. Hewett, Surgeon Apothecary to his Majesty the King. *Companion of the Imperial Service Order* : Mr. Edmund Burke, professor of surgery, Punjab Veterinary College, Lahore, Punjab. *C.I.E.* : Mr. C. S. Middlemiss, superintendent of the Geological Survey of India.

An important question was asked by Mr. W. H. Cowan in the House of Commons on May 23, and an unsatisfactory answer was given to it. Mr. Cowan asked the Secretary of State for the Colonies "whether his attention has been called to a communication received by the Colonial Office from the British Science Guild, dated March 12, 1915, representing that it would be proper and advisable for all departments of the Imperial Government, or of municipalities within the Empire, to make it their invariable rule and practice to pay scientific experts of all kinds for assistance rendered by them, either at committees, or by letter, or in any other way, such payments to include not only refunds for travelling expenses or other out-of-pocket expenses or maintenance, but also a proper fee for the professional assistance rendered; and whether he will appoint a committee to consider and report upon these proposals of the British Science Guild with a view to an equitable settlement of the matter." The answer of the Colonial Secretary was :—"I have seen the communication in question, and, so far as the Colonial Office is concerned, I agree with my predecessor in thinking that there is no sufficient ground for modifying existing arrangements. The second part of the question does not, therefore, arise." What we should like to know now is why the principle of gratuitous service is not applied to legal as well as to scientific experts. The only reason we can suggest is that men of science have been willing to place their knowledge at the disposal of Government departments without asking for fees, whereas members of the legal and other professions require payment for their opinions. The action of the Government in making no provision for the payment of scientific men appointed to serve on committees, or otherwise called upon for advice, influences the attitude of municipal councils and other public bodies throughout the country, and is thus largely responsible for the common view that science has no commercial value. What can be obtained for nothing is lightly prized by the British mind, which measures the importance of advice by the amount paid for it. If science were a lucrative profession, it could command high fees for national services; but as it is not, scientific men commonly permit themselves to be exploited, and are expected to find their own reward in the interest of their work.

THE adjourned extraordinary general meeting of the fellows of the Chemical Society to consider the question of the removal of the names of nine alien enemies from the list of honorary and foreign members of the society will be held on Wednesday, June 21, at 8 p.m., in the theatre of the Civil Service Commission, Burlington House, W.

THE Paris correspondent of the *Times,* in a message dated June 4, states that the Committee of the French Senate appointed to consider the Daylight Saving Bill has, after hearing a statement submitted by M. Painlevé, adopted a resolution which empowers Parliament to advance legal time by one hour until October 1, and not for the duration of the war. The Rome correspondent of the *Times* reports that the new Summer Time came into operation throughout Italy at midnight on June 4.

THE second Japanese Supplement of the *Times,* issued on June 3, contains contributions from eminent Japanese and European authorities on Japan, among them some of scientific interest. Prof. F. Omori describes the work carried out in recent years in the investigation of volcanic and seismic phenomena in Japan. In reference to the Sakurajima eruption, in January, 1914, he notes that the total amount of ejecta from the volcano, which is only 3700 ft. in height, was sufficient to have buried the entire city of Tokyo, 31 square miles in area, to a depth of about 103 ft. An article by Mr. Robertson Scott, on enthusiasm for rural instruction, refers to the Japanese zeal for education and progress, which finds expression in the Young Men's Associations. These associations, a feature of every village, have for their object the intelligent organisation of local resources. Technical instruction is very thorough. On the subject of rice-growing, for example, Japanese authorities know not only all the East knows, but all that is known in the rice tracts of Italy and Texas. The rapid development in the past few years in the application of electricity to mechanical power, lighting, and locomotion in Japan is another illustration of the same spirit, and is dealt with by Prof. Abe, of Waseda University, writing on municipal problems. Baron Kikuchi writes in favour of the adoption of *Romaji,* or Roman letters, in place of the Chinese characters with which Japanese is now written. This reform is rendered difficult by the fact that the language is developing along ideographic, rather than phonetic, lines. New words are formed wholesale by the simple juxtaposition of Chinese characters with reference to their pictorial or symbolic meanings, and regardless of their sounds. The resulting homonymy in the literary language is the focus of the problem.

DR. J. E. SWEET, whose death is reported at the age of eighty-five, was president of the American Society of Mechanical Engineers in 1883, and was the first president of the Engine Builders' Association of the United States. From 1873 to 1879 he occupied the chair of practical mechanics at Cornell University.

MR. W. STANLEY, known by his work on long-distance light and power transmission by alternating currents, has died at his home at Great Barrington, Mass., at the age of fifty-seven. He was successively chief engineer of the Westinghouse Electric Co., the Stanley Electric Manufacturing Co., and the Stanley Instrument Co. He had been vice-president of the American Institute of Electrical Engineers.

THE death is announced, in his seventy-sixth year, of Mr. E. L. Corthell, president of the American Society of Civil Engineers, and of the American Institute of Consulting Engineers. He had been connected with some of the most important engineering enterprises, not only in the United States, but in Latin America. He was formerly consulting engineer of the Department of Public Works in the Argentine Government. One of his most conspicuous achievements was the designing of the harbour works at Tampico, which raised that port to the first rank in Mexico. As a trustee of the University of Chicago, Mr. Corthell played an important part in the foundation of the school of engineering and architecture at that institution.

THE ninety-eighth annual meeting of the Société Helvétique des Sciences naturelles will be held on August 6–9 at Tarasp-Schuls-Vulpera, in the Lower Engadine, north-east of St. Moritz, in order to facilitate visits to the Swiss National Park. There will be the following sections, as well as several general conferences:—Mathematics and astronomy; physics; geophysics and meteorology; geology and mineralogy; chemistry; botany; zoology; entomology; anthropology and ethnography; physiology and medicine. Persons proposing to communicate papers to any of the sections should write, before July 1, to the president, M. le Dr. Chr. Tarnuzzer, Chur, Switzerland.

SIR OLIVER LODGE has sent to the *Times* a translation of the letter sent by Prof. Max Planck, of the University of Berlin, to Prof. H. A. Lorentz, of the University of Leyden, in March last upon the subject of the manifesto signed by ninety-three German scholars and artists, published in August, 1914. Prof. Planck says that the terms in which the appeal was drawn up "led to mistaken conceptions as to the attitude of the signatories, as I have repeatedly discovered to my regret." As the letter has been published in Holland, it is of interest to place a full translation on record. The substance of the letter appeared, however, in the *Daily Chronicle* of April 24, and was given in NATURE of April 27 (p. 186).

MISS E. G. EVEREST, of Chippens Bank, Hever, Kent, whose bequests for a home of rest and a bird sanctuary are announced in the *Times* of June 5, was a daughter of the late Col. Sir George Everest, C.B., F.R.S., Surveyor-General of India, in honour of whom Mount Everest was named in 1856. From the terms of the will we learn that Miss Everest left her house to the National Trust to be used as a home of rest for tired brain-workers, particularly writers and artists. The land round the house has also been bequeathed to the National Trust to be used as a public park for the use of the nation, and as a bird sanctuary, where bird-life shall be encouraged, together with 8000*l.* for the maintenance of the estate. Miss Everest also left the residue of her estate, after providing for some legacies to relatives and others, for the formation and maintenance of a college in India, on lines approved by the natives, for the education of natives by natives.

A PAMPHLET on the urgent necessity of establishing an Imperial School of Technical Optics in this country has recently been issued, with a foreword by the Minister of Munitions commending the scheme to the generous consideration of all patriotic citizens who can assist in providing the requisite funds. The scheme was originally submitted by the governing body of the Northampton Polytechnic to the Technical

Education Board of the London County Council in 1903, and has been under the consideration of committees and sub-committees of the Council ever since. Both the Council and the various Government departments which have been approached in the matter admit its urgency, but the sum of 40,000*l.* necessary for carrying out the scheme has not been provided by either authority. As the scheme, if carried out, would establish an institute in Clerkenwell which would benefit the optical industries, both locally and throughout the kingdom, there seem strong reasons for making the appeal for funds over a wide area.

AN article under the title of "Air Navies of the Future" appears in the *Fortnightly Review* for June. It consists mainly of a discussion as to the likely developments in our air services in the near future. As is usually the case in such articles, the discussion is highly imaginative, and belongs rather to the realm of speculation than to that of science. The scientific statements are indeed often incorrect, as, for example, the statement that the velocity of shrapnel bullets and pieces of steel falling from a height of 20,000 ft. will be very high, and that such fragments will be highly dangerous in consequence. As a matter of fact, the limiting velocity of such bodies will rarely exceed 500 ft. per second, and the velocity on reaching the earth will be very nearly the same for all heights above 5000 ft. The one point of real interest in the article concerns the practicability of building very large aeroplanes; the writer contemplates one of 240-ft. span. There is certainly nothing inherently impossible in the building of such a machine, but it opens up a whole series of new difficulties, both aerodynamic and constructional. It seems unlikely that such aeroplanes will be built for use in the present war. The great majority of present machines are less than two tons in weight, and the five-ton aeroplane has yet to become common. It would seem that the best course to pursue is to concentrate on the construction of moderately large machines, say about five tons total weight, before attempting anything approaching a Zeppelin in carrying capacity.

IN monograph vol. xii., No. 1 of the University of California Publications in American Archæology and Ethnology, Mr. E. W. Gifford discusses the composition and age of some Californian shell-mounds. More than half their contents consist of molluscan shells, the remainder being bones, charcoal, ash, and other substances. The presence of large quantities of oyster shell (*Ostrea lurida*) points to the similarity between the conditions at the time of their growth and those of modern times. The writer enters into an interesting discussion of the age of these mounds, based largely on the assumed numbers of the population during the period of their construction. The result is that the age of one mound, that of Emeryville, appears to be from 3700 to 3300 years. The puzzle of their age, he observes, "requires for its solution every scrap of information bearing on the mounds. A knowledge of shell-mound composition, of population, of artifacts, of skeletal remains, of environment, or of food alone will not solve the problem. The proper combination of all these is necessary to gain the end."

DR. GIUSEPPE DESPOTT, in the *Zoologist* for May, deplores the destruction of bird-life which has been taking place in Malta during the last few years. Five or six species are now in imminent danger of extermination. The number of both licensed and unlicensed sportsmen and fowlers is so large that very few chances of breeding are afforded to any of the resident species. Such a thing as a "close season" is unknown in Malta, yet, remarks the author, for some species at any rate, this is "a consummation devoutly to be wished."

THE *Scientific Australian* for March gives a brief account of the new Zoological Gardens in Sydney, which are now nearing completion. About sixty acres of land, lying between the main arms of Sydney Harbour, have been devoted to this purpose. The site secured is not only one of great natural beauty, it affords also peculiarly suitable conditions for its purpose, since it comprises rocky, sheltered slopes and gullies covered with natural trees, scrub, and undergrowth. The housing of the animals will be on a generous scale and in conformity with the most recent standards —that is to say, there will be no cages in the ordinary sense, bars being replaced by deep trenches. The birds, of course, are an exception to this rule, but since the aviaries provided allow of full powers of flight, and reproduce the natural conditions of the occupants, so far as is possible, this exception is of no moment. A number of photographs afford an insight into what has been done. One of these, the elephant-house, is distinctly disappointing, the outdoor area being but a concrete yard provided with a bath in the form of a huge tub placed in the surrounding trench, and having its rim studded with spikes. This is, to say the least, inartistic.

DRS. WATKINS-PITCHFORD, A. J. Orenstein, and W. Steuart have conducted a preliminary inquiry into the prevalence of pulmonary tuberculosis among the natives working in the mines of South Africa. The conclusions arrived at are:—(*a*) That the disease in its open, or communicable, stage is far less prevalent amongst natives actually working on the mines than has been hitherto supposed; only one case, out of 400 examined, has been detected. (*b*) That the problem of the control of the disease is not so formidable as has been anticipated, and that its total eradication from the mines, therefore, appears to be a feasible proposition. (*c*) That although 107 natives were examined whose term of employment underground exceeded two years only one was found with marked X-ray signs of silicosis apparently uncomplicated by tuberculosis; it seems, therefore, fair to surmise that marked silicosis is at least not more prevalent than pulmonary tuberculosis. Various recommendations are made for the prevention of the disease (*Medical Journal of South Africa,* 1916).

THE fossil remains discovered at Piltdown are being closely studied and debated by American anatomists. Dr. Smith Woodward recognised that anthropoid characters were very clearly marked in the mandible, which he ascribed to Eoanthropus. Prof. Waterston (NATURE, November 13, 1913, p. 319) directed attention to the close resemblance of the skiagram of the Piltdown mandible to that of a chimpanzee, and regarded it as incompatible with the skull. That also is the opinion which Mr. Gerrit Miller, jun., has formed (Smithsonian Misc. Coll., 1915, vol. lxv., No. 12) after a systematic comparison of casts of the Piltdown fossils with corresponding bones of men and anthropoid apes contained in the National Museum of the United States. Mr. Miller regards the mandible as that of a chimpanzee which had its habitat in England during the Pleistocene epoch, and makes it the type specimen of a new chimpanzee species which he names *Pan vetus,* a procedure which has been already questioned by Dr. Chalmers Mitchell (NATURE, December 30, 1915, p. 480). Dr. Wm. King Gregory, of the American Museum of Natural History (*Amer. Mus. Journal,* 1914, vol. xiv., p. 189), regards the canine tooth, not as a right lower, but as a left upper member of the dental series, an opinion accepted by Mr. Miller. At a recent meeting (January 24, 1916) of the Odontological Section of the Royal Society of Medicine, Mr. W. Courtney Lyne made an elaborate analysis of the canine tooth, and gave as his opinion that the canine tooth was "incongruous in this [Piltdown] mandible." We are of opinion that future discovery will show that all three specimens are, as Dr. Smith Woodward inferred, parts of one individual, or at least of individuals of one species. A closer acquaintance with the anatomy of anthropoid apes will reveal many similar incongruities in their structure. If mankind has been evolved from an anthropoid stock the occurrence of a combination of human and anthropoid characteristics in earlier or dawn human forms, such as occur in Eoanthropus, is just what we ought to find.

The coast-section of Monte Hermoso, near Bahia Blanca, Argentina, has been relied on by authors who assign a high antiquity to man in South America (see Nature, vol. xcii., p. 144). Mr. Ricardo Wichmann, however, contributes to *Physis* (tomo ii., 1916, p. 131) an account of the present condition of the exposure, and remarks that F. Ameghino must have compiled his sequence of formations from observations made at various localities. The surface of the Hermosean beds now exposed passes beneath the Puelchean without any appearance of unconformity, and the author was unable to satisfy himself that the angular fragments of quartzite, regarded by Ameghino as human implements, belong with certainty to the Puelchean horizon.

The famous intermittent spring at Rajapur, in the Bombay Presidency, is the subject of a short paper by the Rev. Dr. A. Steichen, S.J. (Bulletin No. 14, Indian Association for the Cultivation of Science). A careful record of the flow of the spring, kept since 1883, shows that the flow lasts for sixteen to sixty-eight days, followed by a dry period of 291 to 1189 days. Dr. Steichen has compared these periods with the records of rainfall, and finds that there is no obvious correspondence between the two. This makes it unlikely that the intermittency of the spring depends on a simple siphon-like arrangement of channels connected with an underground reservoir. Dr. Steichen supposes that the channels have this arrangement, but that they become choked with deposits of lime, which stops the flow in many cases before the reservoir is empty. This, he believes, will also explain how the flow may begin as late as five months after the last drop of rain has fallen. Whether or not this is the true explanation of this extraordinary spring, there certainly is much limy matter in suspension in the early part of the flow.

In a paper published by the University of Nevada Mr. S. P. Fergusson makes some interesting remarks on the use of high-level meteorological observations in making forecasts of temperature. His comments refer more particularly to Mount Rose, a mountain 10,800 ft. high, but he discusses the results from other high stations, such as Mount Washington, Pike's Peak, Colorado, Ben Nevis, and others. Mr. Fergusson finds some correlation between the changes on the summit and the subsequent changes in the lowlands, but on the whole the impression given is that mountain stations are not of much use for forecasting. Pike's Peak, Mount Washington, and Ben Nevis were all given up, unfortunately, for meteorology, but their use in forecasting was not sufficient to make up for the cost and difficulty of maintaining them. It is to be hoped that Mount Rose will not share the same fate. It ought not to do so, as many useful inquiries are in progress; also the records are obtained by autographic instruments, which can run for long periods, so that it is not necessary for the observers to remain always on the summit.

In a recent note to the Faraday Society on the annealing of aluminium, Messrs. Seligman and Williams describe certain interesting anomalies in the behaviour of this metal. Hard-worked aluminium is more readily soluble in nitric acid than the annealed metal. On heating the hard-worked metal to 125° C. a definite change in the rate of dissolution is brought about. A sample of the hard-worked metal which lost 56 mgr. per 100 sq. cm. per 24 hours in 1·42 nitric acid only lost 39 mgr. when similarly exposed after being annealed at 500° C.—a decrease of 30 per cent. On annealing for 10 hours at 125° C. there was a decrease in the rate of dissolution of 5·3 per cent. It was anticipated that if the heating were prolonged the decrease in the rate of dissolution might be augmented. This was not found to be the case, but, on the contrary, as the heating at 125° C. was prolonged the fall in the rate of dissolution diminished until samples heated for 80 hours at 125° C. showed the same rate of dissolution as, or even a slightly higher rate of dissolution than, samples which had not been heated at all. These facts do not tally completely with the observations of other workers. A release of strain as indicated by Dr. Beilby should be accompanied by a reduction in the rate of dissolution, but such a release of strain would not account for the subsequent increase. The behaviour of aluminium as described above is not accounted for by any theories which have yet been put forward.

Part vi. of the Transactions of the Institution of Engineers and Shipbuilders in Scotland contains an interesting paper on the Ljungström steam turbine and its application to marine propulsion, read by Mr. R. S. Portham on March 21. In this type of turbine the flow is radial and outwards from the centre, and takes place between two discs fixed on shafts which revolve in opposite directions. Each disc is fitted with concentric rings of blades, and each ring of blades on one disc serves as guides for the ring on the other disc, which surrounds it, and is concentric thereto. The relative speed is thus doubled, as compared with a turbine having fixed guide blades, and the system therefore necessitates only one-quarter the total number of rings for the same efficiency. The illustrations in the paper are exceptionally good, and includes drawings of the largest Ljungström turbine yet constructed. This turbine develops 10,000 b.h.p. at a speed of 3000 revolutions per minute; the diameter of the outer blade ring is 34 in. only. Each of the revolving shafts is connected to an alternator, one at each end of the turbine. The condenser is placed underneath. The overall length is 24 ft., height 21 ft., and the weight of the complete turbo-alternator is 45 tons. A machine of this type of 3000 kilowatts, tested in January last with steam at 160 lb. per sq. in. superheated 280° F., gave a consumption of 11·15 lb. of steam per kw. per hour, and showed a thermodynamic efficiency of 87 per cent., as compared with the ideal engine.

In connection with the electrification of the North-Eastern Railway, the *Engineer* for June 2 contains illustrated particulars of the goods locomotives. These were designed and built at the Darlington works of the North-Eastern Railway, under the direction of Mr. V. L. Raven. There are four enclosed motors, each driving an axle through single-reduction twin gearing. The test results are of interest. A train of 800 tons was hauled from Newport to Shildon, with stops on certain of the heaviest gradients; this train was stopped and started on a gradient of 1 in 103. The maximum draw-bar pull was 16 tons, and the average speed from Newport to Shildon was 18·3 miles per hour. On a gradient of 1 in 230 and 4·5 miles long an average speed of 23 miles per hour was obtained. The locomotive also proved capable of hauling a train of 1400 tons on the level at 26 miles per hour.